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ABSTRACT

This essay explores many of the theoretical and practical issues involved in the establishment and operation of interdisciplinary educational programs in child development. The discussion does not offer categorical answers, but raises provocative, complex questions about the qualitative and quantitative aspects of interdisciplinary educational programs. There are some heuristic hypotheses advanced about the importance of matching evolving professional and paraprofessional personalities, and programs for optimum interdisciplinary education. Factors which facilitate or obstruct the growth and development of interdisciplinary educational programs are discussed, and questions are posed about cost-benefit factors in education and service. Fundamental clinical research is called for which will substantiate or dispel with hard data the rather mystical reputation interdisciplinary education now enjoys. (CS)

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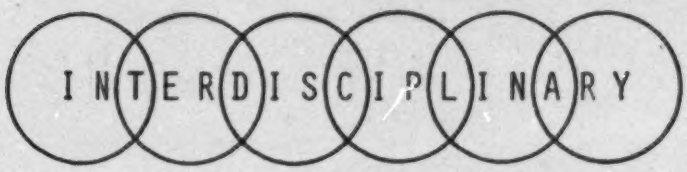

EDUCATIONAL PROGRAMS IN CHILD DEVELOPMENT

*By John H. Meier, Ph.D.**

PS 007054

Rationale for Interdisciplinary Learning Experiences

There is presently a mushrooming interest in and increased support for educational programs in child development which are labeled interdisciplinary. This essay explores many of the theoretical and practical beliefs and issues involved in the establishment and operation of such programs. Terms such as educational instead of training, and interdisciplinary instead of multidisciplinary are deliberately chosen, as explained in the next section of this essay. The differences between these programs are very great and range from those which are comprised of two or more closely related disciplines, each of which shares a quite separate portion of a student's (instead of trainee's) instruction, to programs involving ten to twenty disciplines, some of which are very distinct and apparently unrelated. The latter may be rather loosely knit or firmly woven together by the

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interests and needs of the students plus the genuine desire of the persons representing the various disciplines to share in the development of the students.

The principal rationale for providing interdisciplinary educational programs for persons to work in child development is that they should have a broad knowledge about and at least general proficiency in all of the fields impinging upon the children with whom they work. This is in addition to the specialized knowledge and skills in the specific discipline with which they will be primarily identified. Moreover, in educating persons to deal effectively with the many complexities of human growth and development, it is exigent that the sophistication of as many relevant disciplines as possible be brought to bear upon the consideration of any problem which might be presented by the focal child (this essay uses the word child to represent client, patient, subject, pupil, learner, etc., since these other labels traditionally have definite disciplinary connotations). Thus it becomes readily apparent that since a human being's growth and development involve physical, social, emotional, and intellectual domains, it is necessary that the biological, behavioral, and social sciences all dedicate their respective expertise toward providing a fuller understanding of the whole child.

The composition of the biological sciences, behavioral sciences, or social sciences is quite controversial in terms of specific disciplines which would do justice to analyzing and prescribing a satisfactory resolution of any given problem in child growth and development. As an example, there are across the United States at this writing more than thirty University-Affiliated Facilities (UAFs), such as the JFK Child Development Center at the University of Colorado Medical Center, each of which has numerous disciplines all housed under the same roof where the staff and students rub minds and elbows daily with regard to the micro- and macro-issues of child development. A highly restricted child development center exclusively addresses the issues presented by individual children referred for evaluation, treatment planning, and intervention programming. The primary disciplines involved are Administration, Audiology, Biochemistry, Cytogenetics, Dentistry, Education, Metabolics, Neurology, Nursing, Nutrition, Occupational Therapy, Ophthalmology, Pediatrics, Physical Therapy, Psychiatry, Psychology, Social Work, and Speech Pathology. The additional disciplines of Law, Religion, Ethics, Architecture, Anthropology, Sociology, City Planning, etc., are represented on the more cosmopolitan (and affluent) child development center staffs which are sufficiently comprehensive to address the highly complex and fascinating child-oriented ecosystems issue involved in that which Doxiadis (1968) calls pedekistics (briefly explored later in this essay).

A review of the sparse literature about interdisciplinary programs yields several additional statements of rationale. These are quoted at length to avoid doing additional violence by paraphrasing them out of context and because they reflect the writer's biases quite well and articulate several different important issues. Szasz (1969) describes the results of deliberations by the Committee on Interprofessional Education at the University of British Columbia which was concerned with comprehensive, continuous health care for people of all ages, sexes, races and creeds, and levels of ability to pay. Although his comments are related to health care, their significance is far broader.

> This partial review of the many trends in health care and health education suggested to the Committee that administrative, economic, social and educational factors all have important influence on the relation of one profession to another. It appeared to the Committee that for future changes to occur in the delivery of health care and the utilization of health manpower, all of these elements must undergo certain alterations. Specifically focusing on the educational field, the Committee felt that students may have to go through a process of interprofessionalization to enlarge their present professional outlook. The result of this process may mean an expansion of the behavior now expected from a health professional to include increased awareness of the need for a comprehensive approach to a broad spectrum of human problems; knowledge of the aids available from members of the other professions; understanding of the attitudes, values and methods of those providing these aids; and the ability to utilize techniques of group dynamics in whatever organizational relation health care services may be offered (p. 457).

In discussing the need for interdisciplinary training, service, and research programs addressed to functionally mentally retarded children, Van Antwerp makes the following observations:

> ...Another measure of the elusiveness of the other 75 percent of retardation not traceable to organic causes is its generic identification... It has been described as sociocultural, psychological, familial, undifferentiated, and functional, the term used here for convenience. The variety of this descriptive terminology alone is a strong indication of the need for a new, broadly interdisciplinary approach to its etiology, treatment, and prevention.
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> An interdisciplinary approach reflects a common ground of all systems theorists, a stress on the interrelationships

of systems not previously considered related, as well as concepts for measuring and changing those interrelationships. There can be seen on the horizon, perhaps not a decade away, knowledge and procedures for relatively complete quantification of interrelationships between social systems. Techniques will at that point enable proof of hypotheses today untestable, and mathematical cost-benefit analyses will reveal the optimum usage of scarce intervention resources.

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...As pointed out by Boulding (1968), specialization in science has reduced interdisciplinary communication and thus has hindered the growth of knowledge. General systems theory, one of the most prominent of the systems sciences, specifically attempts as one of its main objectives to improve communication between specialists in different disciplines.

Already there is one extensive collection of papers on systems approaches to the behavioral sciences (Buckley, 1968). However, it is premature to predict which of the systems sciences will become most useful in the field of retardation. The important point is that retardation scholars must begin to approach their work from an interdisciplinary orientation compatible with the systems sciences, and they must begin the accumulation of relevant intersystem data in anticipation of further breakthroughs in systems approaches to behavioral science problems.

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Thus, there is great potential in a broadly interdisciplinary approach to functional mental retardation such as the one proposed here. It aids epidemiologists, researchers, and those formulating intervention strategies. As an example of its potential, successful intervention in one external system to remedy retardation-producing features may even reduce overall retardation prevalence to an extent much greater than identification of another specific organic cause. Progress in combating functional retardation can reasonably be expected from an expansion and refinement of this approach to its study and prevention (1970, pp. 24 & 26).

Getting helping persons and programs together so that needy children do not fall through the cracks frequently found between disintegrated educational and related service programs is a recurrent theme in the overtures for interdisciplinary programs.

...Good services for the retarded that are provided early and on a continuum will show increasing results at diminishing costs. It is only during the last decade that services for the retarded are beginning to evolve and though there are many

excellent services available today, they are often isolated or highly specialized. The needs in the field are not fully clarified or interpreted and there is still the problem of developing well integrated services.

The rapid increase in knowledge in such fields as science, medicine and the behavioral sciences have not only helped to solve many old problems, they have created a good many new ones for the practitioner. The wealth of available data that often have not yet been organized into groups or syndromes, makes it almost impossible for the individual to absorb all available information even in his own field. To acquaint oneself with new findings in related fields becomes even more problematic. These factors create needs for more and more specialization and greater expertness in smaller and smaller areas. This in turn is likely to lead to fragmentation of knowledge and effort. The results may be development of highly specialized resources. Such resources may offer excellent service in a narrow field and assure attention to groups of handicaps that have either strong public appeal like polio, or have long been neglected like mental retardation. They are likely however to have definite shortcomings. The accumulation of highly specialized data, the fascination with the possibility of being quite effective in small, well circumscribed areas can easily create overemphasis on such areas and may lead to loss of perspective of overall needs and problems. Such specialization may result in lack of integration of resources and, related to this, to duplication of services and to serious gaps in the services available (Beck, 1962, p. 789).

Another commentary from a nutritionist with a broad perspective suggests that there is presently a sort of paralysis of analysis and that the time has come for some synthesis.

...the problems of the handicapped person are complex and the nutritional problems of such a child transcend the categories of your discipline--or of any <u>single</u> discipline. On this premise, I offer the proposition that those who are entrusted with the care of the handicapped child should have an awareness of--and an appreciation for the <u>interdependence</u> of their particular expertise and the expertise of the several disciplines that may be involved in this complex human cry for assistance. Such a response, in my judgment, implies the need not merely for a multiple discipline approach but for a <u>coordinated interdisciplinary program</u> of care. Most importantly, it seems to me, it requires the direction and

> leadership of those who manifest the qualities of the humane interdisciplinary person. That is to say, in planning for the care of the handicapped we should first look for individuals who have acquired a certain breadth of liberal knowledge and interest, the techniques of interaction and the attitudes or basic life-style of the person who, as Arrowsmith notes, can spread across disciplines and is sensitively respectful and aware of the contribution which various fields make to the quality of men's lives.
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> ...In some fields--especially in the health sciences and the biological sciences--scholars find heady excitement in the fact that recent discoveries about the nature of the activity that occurs at the interface of the various disciplines promises to unlock the secrets behind very complex systems. It is probably these disciplines which will soon emerge out of the stage of analytical research--which has required high specificity and fragmentation of the discipline--to the stage of synthesis which will enable the scholar to study ever-enlarging systems. The promises which such synthesis holds out are staggering to the imagination (Heiss, no date, pp. 17 & 19).

Many health-oriented programs patronizingly pay obeisance to disciplines like early childhood education but fail to pay the teachers' salaries or be concerned with generating relevant recommendations for preschools and regular schools. Leaving out or giving only a negligible nod of acknowledgement to the teacher in an interprofessional program dealing with children is all too commonplace.

> Next to the parent, the teacher is perhaps the most important person in the interdisciplinary team, since she must work with the children on a daily basis. She is the one who must become the educational diagnostician; she is the one who must determine the best techniques of teaching and working with children. However, the teacher is often the last person to be consulted on a team level. Often there is very meager information that filters down to the teacher. The complaint of teachers that psychological reports are not helpful for their work with children is not necessarily an indication of a poor report per se. Most likely the report was written independently of the teacher without any feelings of interdisciplinary necessity nor of the language of the teacher in mind. It is not enough to say that the report needs to be written in a language that the teacher could understand. The fact is that the report cannot be made without the collaboration of the teacher. I am making a plea that the teacher

> have a more active role both in diagnosis as well as in the continued evaluation process. In this way the teacher would be making a vital contribution to the development of children rather than being just a listener or a carrier of tales. Without the help of the teacher, reports become rather useless maps of the children's functioning with major locations designated but with little or no indication of the roads to be traveled, or the immediate, specific, goals that must be attained before reaching more long-range goals. Through the interdisciplinary approach everyone is working together toward the ultimate goal of helping children (Leichman, 1967, p. 1).

It is noteworthy that, whereas the writer has for several years been referring to his task as one of orchestrating virtuosos, Cruickshank, who also directs an exemplary UAF, cites a similar analogy and then elaborates upon it.

> ...During the past several years many have watched with keen interest the growth and maturation of the young Japanese musician and conductor, Sciji Ozawa. Mr. Ozawa, a protégé of Bernstein and now a conductor of renown of both the Toronto and San Francisco symphony orchestras, was recently interviewed with respect to his perception of a symphony orchestra. "An orchestra, after all," Ozawa is reported to have said, "is a very unnatural thing. An impossible thing, almost. A musician naturally wants to play alone, or in a group where he can be heard, appreciated, and still express his individuality...the musicians must submerge themselves into an orchestra to make the necessary sound and let one musician tell them how to play. Whenever it goes well, I am happy, because it is surprising that it ever works at all" (March, Robert C., "Ozawa in Transit," Saturday Review, September 27, 1969, p. 631).
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> The team leader of which Ozawa speaks must have traits of compassion and understanding as well as a firm resolve to unite his group into a common action. To this end, the goal to be attained is the first priority, not the fact that he is a pianist, a cellist, a psychologist, a physician, a lawyer, or an educator. To the end of concerted action, far greater in its implications than the contribution of a single discipline, will be drawing the best from each whatever may be its contribution. Under this concept, historical roles of medicine, for example, cease to be important. The historical roles of education, psychology, law, and other significant disciplines of our time change. Legal responsibilities of a given profession can be accepted or may need redefinition and

modification. The concept of "paramedical" is soon understood to be no more fundamental or important than any other disciplinary term. Sometimes education is paramedical; but equally as often if not more so, medicine is "paraeducational." When this is learned and understood, interdisciplinary power is ready to be released in the appropriate solution of human problems. The leader of the interdisciplinary team understands this delicate balance and deals with it. The team members know that the disciplinary leader of today's attack group may not be the appropriate person for the same role for tomorrow's problem by the same group of people. Leadership flows from discipline to discipline and falls when and where it is appropriate on a given discipline. Leadership never remains fixed, nor is it the property of a given discipline. In the interdisciplinary team, medicine may one day be the focal point of the team; occupational therapy, nutrition, nursing, speech pathology, education or other, the core profession of the next day. Position in the interdisciplinary structure is of little import; each discipline uses its skills of the moment in the best possible way to seek solution to the problem before it. The leadership role is not defined by historical prerogatives, regulation or law, by length of academic preparation, salary schedule, or chronological age, but by the pertinence of the discipline to the agenda before the team and by the capacity of the individual representing that discipline to weld the other members into a force for the problem's solution, whatever it may be.

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These heroic and significant attempts at the solution of one uniquely significant human problem demand the best of every discipline. The outcome will be successful only insofar as individuals alone and professional disciplines representing many of the same mind, mature and demonstrate a willingness to work together in Ozawa's "unnatural thing," to cease playing alone except where solo action is truly appropriate, to be content to express individuality through the harmony of action in concert, to submerge themselves into an orchestral team to make the necessary sound out of which will emerge a new concept often larger than any of its parts. In this manner professions can take on a new dimension as servants of mankind. The pieces of the human mosaic receive the attention of the total skills of science and the puzzle is constructed with accuracy and permanence in a way no other attack can accomplish (1973, pp. 8-9, 13-14, & 21).

As shown by the representative citations above, there is considerable rationale for interdisciplinary programs, and, depending

upon one's own perspective, the composition and function of these programs is highly variable. Part of the variability is undoubtedly due to definitions of terms and the following section deals with some of the inherent semantic problems.

Definitions

Even though they are all located within the same physical facility, with such a wide array of disciplines the distinction between an interdisciplinary and multidisciplinary program becomes critical. If the many virtuosos comprising a team of persons from many disciplines are not carefully orchestrated into an harmonious group, the cacophony can be intolerable and counterproductive. It is entirely possible to have a multidisciplinary program simply comprised of multiple disciplines which do not necessarily talk to or share insights and skills with one another at all.

In order to clarify the slippery semantics, Webster's New World Dictionary (1968) was consulted for a series of definitions which are germane to this section. Only the parts of the definitions which seem to apply are included; the reader may have to supply some logical links in certain instances (italics are the writers'). Since there is some question about the connotations of training versus educating, the following definitions may clarify the issue.

> train: To guide the mental, moral, etc., development of; bring up; rear. To instruct so as to make proficient or qualified; as, nurses are trained at this hospital. To discipline or condition (animals - trainees?) to perform tricks. (colloquial) To condition (a child, puppy, trainee, etc.) to defecate and urinate in the proper place (p. 1545). Academic hazing?

> trainer: A person who trains; specifically, a) a person who trains animals (trainees) to do tricks; b) a person who trains athletes (trainees) for sports (academic) contests (p. 1545).

> educate: To give knowledge or training to; train or develop a knowledge, skill, mind, or character of, especially by formal schooling or study; teach; instruct. To form and develop (one's taste, etc.) (p. 461).

> educator: A person whose work is to educate others; teacher. A specialist in the science of education; authority on educational problems, theories, and methods (p. 461).

There is also considerable confusion about just what a discipline is and whether or not there is any difference between an interdisciplinary and a multidisciplinary program. The following definitions seem to shed some light on the distinction.

> discipline: A branch of knowledge or learning. Training that develops self-control, character, or orderliness and efficiency. The result of such training; self-control, orderly conduct. Acceptance of or submission to authority and control. A system of rules and methods as for the conduct of members of monastic (or academic) order. Treatment that corrects or punishes (p. 416).

> disciple: A pupil, follower, or adherent of any teacher or school of religion, learning, art, etc.

> inter: Between, among, as in interborough; with or on each other (or one another), together, mutual, reciprocal, mutually, reciprocally, as in interact (p. 761).

It is interesting to note that the word "interdisciplinary" is not included on page 762 where the words go from interdigital to interest with no discipline in between.

> multi: Having, consisting of, or affecting many, as in multi-colored; more than two (or sometimes one), as in multilateral, multi-cylinder (p. 965).

Besides the notion of interdisciplinary, Szasz (1971) somewhat personalizes the idea by describing interprofessional programs; thus the definition of a professional and a paraprofessional is also implicated in this discussion.

> profession: A vocation or occupation requiring advanced training in some liberal art or science; and usually involving mental rather than manual work, as teaching, engineering, writing, etc.; especially medicine, law, or theology. The body of persons in a particular calling or occupation.

> professional: Of, engaged in, or worthy of the high standards of, a profession. Engaged in a specified occupation for pay or as a means of livelihood. Having much experience and great skill in a specified role.

> para: Associated in a subsidiary or accessory capacity; closely resembling.

A conglomerate definition of an interdisciplinary or interprofessional educational program drawn from the above definitions conceivably could be: 1) A group of cosmopolitan and sporty monks playing at potty-training of domestic animals for a fee; or, less facetiously, 2) An educational program staffed by a group of persons skilled and informed about different aspects of a general field of endeavor who pool their talents and knowledge for the reciprocal benefit of students who are interested in learning their skills and information as a means of livelihood. Hopefully, the second conglomerate definition comes closer to describing the mission of an interdisciplinary educational program in a UAF or other Child Development program.

Optimum or Maximum Mix

A concern related to definition is determining an optimum vs. a maximum mix of diverse disciplines, the latter of which can be a very well-rounded program with a short radius. In other words, if there is a large number of scarcely related disciplines all focusing on the same developmental deviation, the very time required and possible overlap could, paradoxically, result in a fairly shallow contribution from each, and the sum of the parts would not deepen it in the least. When cost-benefit analyses are applied to various alternative educational systems, it is crucial that the yield of new information and enriched learning experiences warrant the cost of maintaining the many different personnel and their attendant support systems. There seems to be a sort of Parkinson's Law obtaining whereby each discipline, after it gains a foothold in a program, proceeds to make itself indispensible and may even spend a good part of its time and effort justifying its existence.

It can be utterly exasperating, if not devastating, to a highly specialized person when a far less well-trained and less-experienced individual gets equal or better results with the program's students or focal children in terms of movement toward certain predetermined goals. This even threatens individual job security in the sense that those who believe that the best way to job security is to make themselves indispensible to an organization. This is sometimes tried by creating a certain mystique about their cult and using obscure jargon to further obfuscate what they really do, presumably to avoid the contempt of familiarity. Such a lack of clarity may signal a correspondingly lack of security, which in turn should be investigated to determine whether or not the individual educator or the discipline is functioning productively. As an example of interdisciplinary obfuscation, Morrison offered the following illustration:

> In our population studies, for example, we draw on the perspectives of economists, geographers, and sociologists.
>
> Economists know the price of everything but the value of nothing. An economist, it is said, would marry Elizabeth Taylor for her money.
>
> The geographer, of course, believes that everything is connected to everything else, only more so, the nearer things are to each other.
>
> And a sociologist is someone who can spend a hundred thousand dollars of somebody else's money to discover that a house of ill-repute is located just around the corner. He reports this finding in a language that no one can understand.
>
> The hallmarks of an interdisciplinary study, then, are that it seems over-priced, it shows that everything depends on everything else, nobody really understands what it says, and the money (it costs) turns out to have been yours" (1973, p. 15).

Evolution of Interdisciplinary and Interprofessional Persons

Erikson (1950) has postulated eight ages of man to explain the psychosocial development of the mature human being. Moreover, his theory lends itself to the tracing of the growth and development not only of an individual person but also of a human organization, such as an educational program, which can be anthropomorphized. Bristling new professionals, who are relatively immature in their need for the security of their own mother discipline, typically attempt to establish their own egocentric identity and autonomy among other professionals in an interdisciplinary training, service and/or research program. If the organization itself is in its adolescence, the staff frequently experience the most uncomfortable and anxiety-ridden concomitants of role diffusion and identity crises. This is revealed by professionals identified with a given discipline who are unable to relinquish the narrow but firm grasp they have on a limited portion of the field of human growth and development. They may even selfishly refuse to share it with others or to graciously receive at least a like amount of reciprocal help from the other professionals in the situation. This phenomenon, although not directly related to chronological age or number of years in practice, does tend to be more pronounced among those who have recently finished their own myopic and/or tunnel-visioned unidisciplinary specialization and are very jealous of the precious esoteric fund of knowledge they have mastered and for which they have been ritually rewarded.

> Little in our academic program, or in the life-style of our models, prepared us for a multidisciplinary--much less for an interdisciplinary role. Instead, our intense orienta-

> tion and identification with our own discipline often rendered us inept and uncomfortable outside of its protective confines. If our preoccupation with a major field of interest did not exist before our admission into academia--everything inside of it--from its idioms to its ideology--constrained us to acquire a solitary interest. The rewards of the system sustained that goal and there were often subtle sanctions against one who looked for knowledge or recognition beyond her specialty. Even today the department evokes the deep loyalty of its students and looks with misgivings on those who manifest interest in other areas or disciplines. Originally, the departmentalization of knowledge was an accommodation to the logic of administrative efficiency. Ignoring the protest that nature does not know the boundaries of the disciplines which the university established, that institution proceeded to rationalize the various divisions of knowledge along what appeared to be logically related units or manageable categories. It may not be inaccurate to suggest that one of the major obstacles to the interdisciplinary or multiple approach to teaching and learning is the hardening of these categories (Heiss, no date, p. 18).

> The Committee found that a basic problem inherent in traditional education also contributes to the establishment of barriers. Traditionally, education in western societies has stressed competitive, noncooperative principles. To compete successfully and get ahead of others, as indicated by examination marks and other rewards, has been regarded as a social value by students, teachers and parents alike. The perspectives set in the general education of the student and fostered during his professional education are difficult to change--particularly because few, if any, role models are in the professional schools or in practice--to offer examples of the principles of cooperation (Szasz, 1969, p. 453).

Although one would hope that with the passing of time in an interdisciplinary setting these territorial imperatives and defense systems would break down, such is not always the case. Eysenck's finding about the progressive eclecticism of previously narrowly biased psychotherapists are encouraging but by no means universal, particularly when cutting across highly diverse disciplines which are orders of magnitude apart. The lack of coherence can be further exaccerbated in an embryonic program staffed by immature and/or inexperienced professionals where these factors are especially operative and can lead to a sort of free-floating professional paranoia and reactionary protection of traditional prerogatives, or even feelings of self-doubt, guilt, and inferiority over exercising discipline-oriented autonomy, initiative, and industry.

It is a rare and mature human organization that has attained interprofessional intimacy, generativity, and integrity, allowing it to altruistically channel its physical and psychic energies into providing for the welfare of man and even thinking about the Future of Man as described by de Chardin (1964).

> To accept that Space-Time is convergent in its nature is equally to admit that Thought on earth has not achieved the ultimate point of its evolution.
>
> Indeed, if in virtue of its especial curvature the Universe, following the line of its principal axis, is really moving towards a state of maximal synthesis; and if furthermore, as practical observation shows, its human particles, taken as a whole, still possess a formidable potential of synthesis: then our present situation cannot be anything but "energetically" unstable. We cannot stay where we are at present, either physically or psychically; but looking far ahead we may descry an ultimate state in which, organically associated with one another (more closely than the cells of a single brain) we shall form in our entirety a single system, ultra-complex and, in consequence, ultra-centred.... We thought that we had reached the limit of ourselves. Now we see Mankind extending within the cone of Time beyond the individual; it coils in collectively upon itself above our heads, in the direction of some sort of higher Mankind (p. 92).

As mentioned earlier in this essay, Doxiadis has advanced a highly complex concept of Ekistics which is principally concerned with humanizing the environment to optimize human growth and development.

> a. When man is born he is only partially developed in body, senses, mind and soul. Unlike machines, which are ready to move as soon as they are out of the factory, man is not ready to move; he is simply ready to develop.
>
> b. In relation to other animals, man needs in proportion to the length of his life a longer period of development. Up to a certain point development is positive; beyond it, and for some of his capacities, it becomes negative and man gradually begins to lose his forces of body, senses, mind, and perhaps soul.
>
> c. There is an optimum rhythm of growth and development for man; such rhythm should define the speed at which growth and development take place, the balance which can exist at different times, that is at every phase of the development, between the different aspects of man, etc.

d. The physical environment of man can play a big role in his development as Nature, Shells and Networks also influence the Society and the social environment and therefore the physical environment influences directly and indirectly all aspects of man.

The human and the urban systems

Thus, in a city that can satisfy man - a city for human development the human system must be able to grow within the urban system at the right pace and in the right direction. In other words a city for human development has to help the human system (represented by one or more people) to develop properly. If the urban system is based on the understanding of the human one, then it will give it the chance to grow properly. If it is not, then the urban system may expose man to great dangers, eliminate him by over-exposure, or limit his possibilities of growth and development and distort him by wrong types of exposure. In the first case we adapt the environment to serve man; in the second case we adapt man to the environment and this does not allow him to develop fully and may cause him to suffer from maladaptation or from adaptation to the wrong kind of environment.

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Human development in space

We can now bring the total space used, or potentially used, by man at every age together with his period of exposure to this space, to define the units of space man needs, at each period of his life. On the basis of such considerations, I have developed a system of graphs corresponding to 101 phases in the life of a hundred-year-old person.

In the first, prenatal phase the spatial needs of man are limited to a part of the body of his mother and we can represent his whole potential space as limited to ekistic unit No. 1.

In the second phase, the first year of his life, his spatial needs increase. He moves from his cradle where he is still very close to his mother to crawl on the floor, and then to walk about within his play pen.... During this period the child spends 80% of his time in his room and 20% in the rest of his home of which 10% is spent in the garden.... The kinetic fields of man extend up to the boundaries of his room within which he moves in a natural, independent way, or the boundaries of the home where he moves in a natural, dependent way.

In the third phase, the second year of man's life, his spatial needs extend. The child moves out of the room gradually discovering the other rooms, and the garden. In this phase he still spends the longest part of his life in his room, a large part in the house and only a very minor part beyond it where he is certainly dependent on assistance.

Thus his kinetic fields have now extended up to the boundaries of the house in a natural, independent way, and beyond the boundaries of the house in a natural, dependent way. Probably it is at this phase that the mechanical dependent movements begin, i.e., at this phase it is in the child's interest that he should be taken by carriage or car, beyond the family territory in order to get acquainted gradually with the neighbours and the neighbourhood.

By the 6th phase, the 5th year of his life, the child's spatial needs have increased. The child, having now discovered the world of his room, home, garden, has moved into the streets in order to discover the public space and his relationship with his neighbours. In this phase he probably not only needs to discover his neighbours, but also something of the operation of society, as for example, by going to the local shops.... By this stage the child must have been taught to protect himself from contact with high speed machines, such as the automobiles. It is for this reason that the design of a group of houses must ensure that there is no easy contact between the movements of a child discovering his world and the paths of the cars, which must reach it without interfering with his safety. In this phase the child's kinetic fields extend by his natural independent movement up to the 5th unit, by his natural dependent movement up to the 7th, and by mechanical dependent movement beyond this....

By the 11th phase, the 10th year of his life, the child has started to move over wider areas and he walks without assistance to the elementary school. He must also have learnt to cross the lines of the machines. The child now spends more of his time in larger units, especially in unit 6 corresponding to the area where his school is located. His kinetic fields have extended so that his natural independent movement covers up to unit 6 and his natural dependent movement up to unit 8, that is the unit corresponding to the limits of the small city. Mechanical dependent movement may take the child beyond this district to discover other parts of the metropolis, or the countryside.

. . . . . .

By the 101st phase, the 100th year of his life, man has normally retreated to the smallest unit, which by then is often covered with flowers.... After starting out from the very small unit and after conquering the world space in

> different ways, he proceeded till he reached the maximum possible to his natural and mechanical kinetic fields and then he folded back again to the smallest size of unit (Doxiadis, 1968, pp. 14-15, 19-20, & 23).

Again, considering only the physical well-being of man there are other evolutionary variables which obstruct interdisciplinary functioning.

> Apart from these social and psychologic obstacles, a number of economic and organizational factors require consideration as well. Some authorities suggest that economic self-interest is a motivating factor behind the issue of who performs what health service, and that the fee-for-service method of financing of present day medical practice does not permit utilization of the expertise offered by various professionals. Somewhat related to these economic problems are the administrative structures of hospitals and official and voluntary health agencies that may also block communication and collaboration between professions (Szasz, 1969, p. 453).

In a truly interprofessional program the disciplinary lines melt and fade away to the extent that there may be no distinction between what one specialist and another specialist considers important and seeks to learn about a given child or teach to a given student. This erosion of one's professional identity boundaries can be very threatening to the professional who has neither been trained nor been sufficiently experienced in interprofessional settings. The results can and frequently are similar to that of functional fixedness prompted by anxiety which is manifest by an even more tenacious holding onto one's own disciplinary province in order to reduce the over-abundance of cognitive dissonance caused by the aforementioned paranoia, identity crisis, and role-diffusion phenomena. When an organization and/or the majority of its staff are still wrestling with Erikson's first three stages of trust vs. mistrust, autonomy vs. self-doubt or shame and initiative vs. guilt for having encroached upon the fuzzy and arbitrary neutral zone dividing disciplines and other related developmental phenomena, it does not augur very well for the program and people ever getting themselves sufficiently together for constructive co-productivity.

Facilitation vs. Obstruction in Interdisciplinary Programs

In addition to the maturation match of program and professionals growing up together for optimum interdisciplinary function, there seems to be an interesting array of organizational and personality factors operative in the success or failure to function

smoothly as an interdisciplinary program. Although it is still an heuristic issue, since there are not sufficient data to substantiate the case, preliminary data are beginning to reveal that an open system of management (Likert, 1967) and open personality types (Allport, 1968 and Harvey, 1965) are more conducive to effective interprofessional organizations and staff than are the more closed ones.

A study of the dynamics of the professional firm or organization such as a child development center, using instruments such as those developed by Likert (1967), is revealing in terms of the organizational dynamics contributing to productive or unproductive programmatic efforts involving more than one discipline.

> All the activities of any enterprise are initiated and determined by the persons who make up that institution. Plants, offices, computers, automated equipment, and all else that a modern firm uses are unproductive except for human effort and direction. Human beings design or order the equipment; they decide where and how to use computers; they modernize or fail to modernize the technology employed; they secure the capital needed and decide on the accounting and fiscal procedures to be used. Every aspect of a firm's activities is determined by the competence, motivation, and general effectiveness of its human organization. Of all the tasks of management, managing the human component is the central and most important task, because all else depends upon how well it is done.
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> Until recently, the shifting sands of practitioner judgment were the major if not the only source of knowledge about how to organize and run an enterprise. Now, research on leadership, management, and organization, undertaken by social scientists, provides a more stable body of knowledge than has been available in the past. The art of management can be based on verifiable information derived from rigorous, quantitative research. Independent investigators can repeat the research and test the validity of the findings. Not only is the body of knowledge more stable and accurate, but it is likely to grow continuously as the results of additional research on management are accumulated. Quantitative research anywhere in the world can add to this body of knowledge. Its rate of growth can be accelerated by increasing the expenditures for social science research focused on organizations.

> Research is beginning to be substituted for practitioner judgment in all aspects of management. It has particular relevance in this volume to the management of the human enterprise, which will be our primary orientation.
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> Many persons approach all social science research with a healthy skepticism. This is excellent and to be encouraged. It is, however, at least as important to examine traditional principles and practices with skepticism. Long acceptance does not make a matter right. Common practice does not make it the best practice. Newness does not necessarily ensure an improvement. When deciding what knowledge to accept, what principles and practices to employ, it is decidedly worth while to ask "What is the evidence? How do you know?" Tough-minded examination of the evidence and rigorous separation of objective, quantified data from impressions, expressed judgment, or fads can significantly improve the art of management (Likert, 1967, p. 1-2).

(See Figure 1 on next page.)

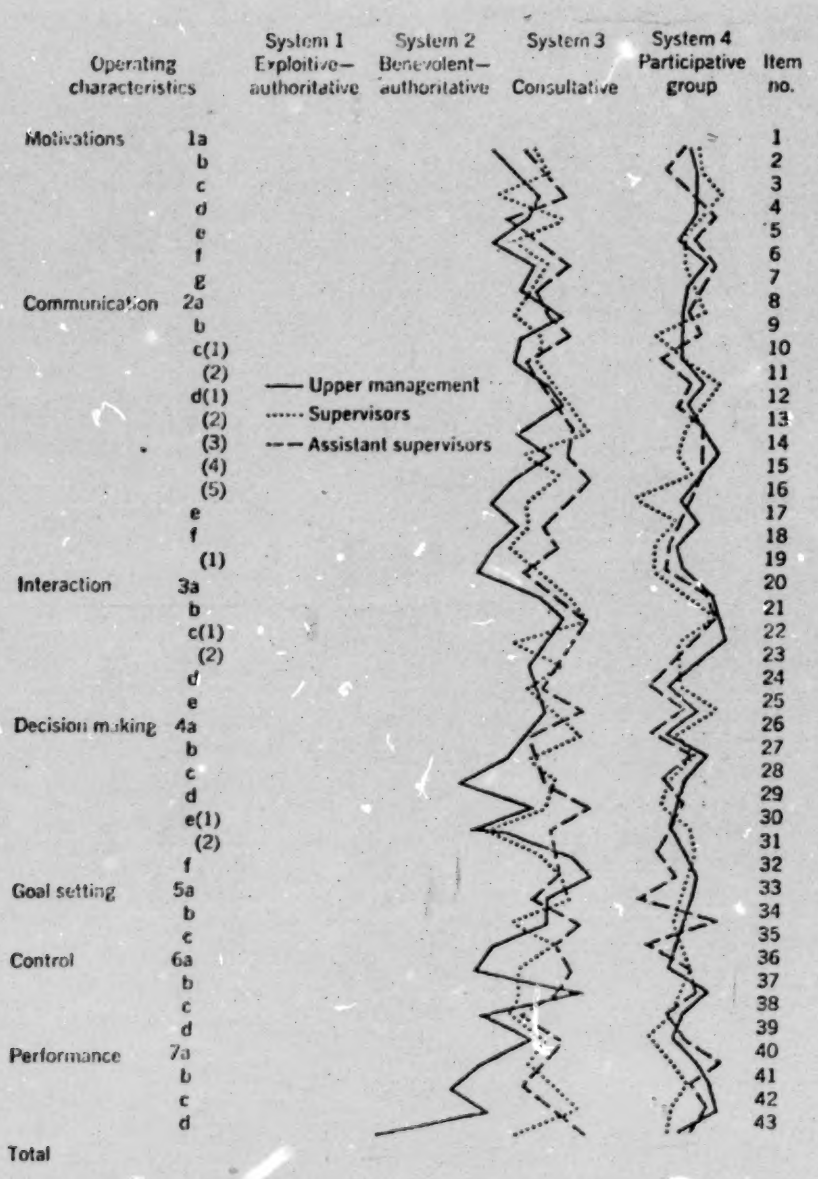
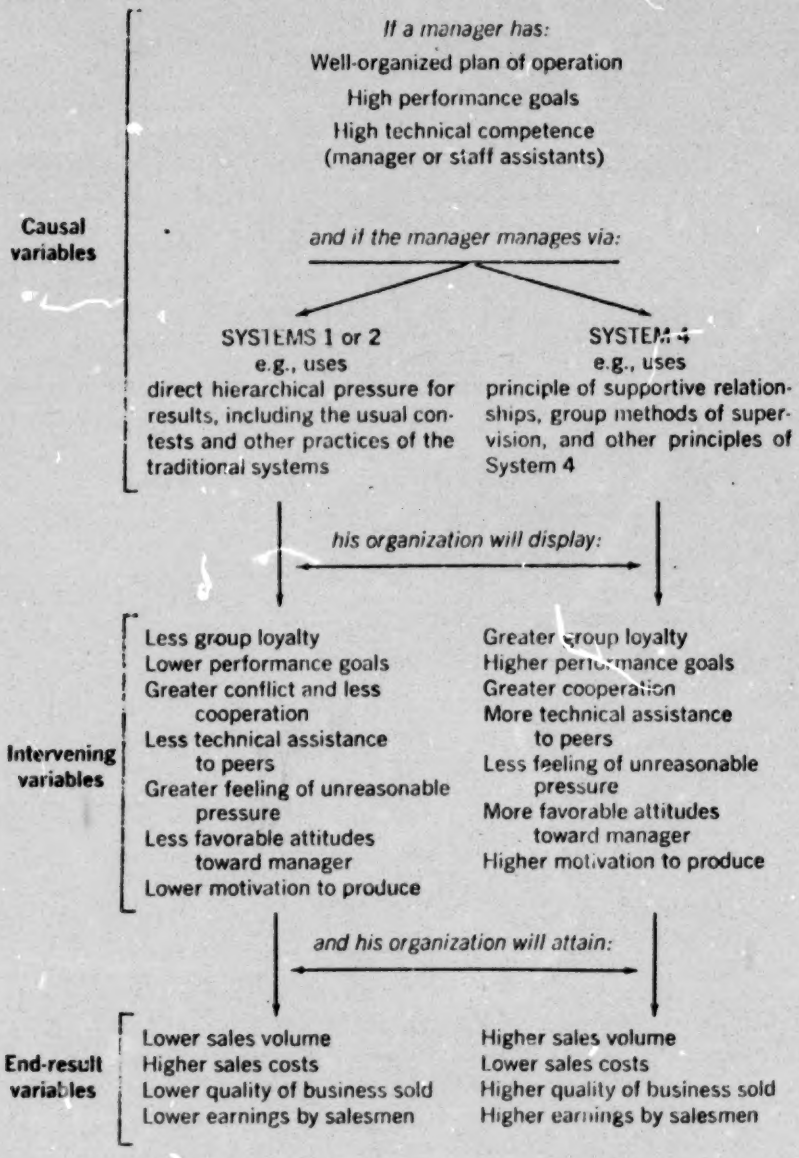


Figure 1: The differences between actual conditions (largely System 3) and ideal conditions (System 4) are shown here as reflecting a well-managed industrial firm. These same graphs essentially parallel the distributions obtained from staff members at the Colorado JFK Child Development Center in 1969 although the actual graphs were a bit further to the left, as seems true of most traditional medical models, many of which are exclusively System 1. A more open System 4 approach is now under trial at the JFK Center.

In an earlier work, Likert (1962) outlined a sequence of developments in a human organization as managed by two different systems.


Causal variables
If a manager has:
Well-organized plan of operation
High performance goals
High technical competence (manager or staff assistants)
and if the manager manages via:
SYSTEMS 1 or 2
e.g., uses direct hierarchical pressure for results, including the usual contests and other practices of the traditional systems
SYSTEM 4
e.g., uses principle of supportive relationships, group methods of supervision, and other principles of System 4
his organization will display:
Intervening variables
Less group loyalty
Lower performance goals
Greater conflict and less cooperation
Less technical assistance to peers
Greater feeling of unreasonable pressure
Less favorable attitudes toward manager
Lower motivation to produce
Greater group loyalty
Higher performance goals
Greater cooperation
More technical assistance to peers
Less feeling of unreasonable pressure
More favorable attitudes toward manager
Higher motivation to produce
and his organization will attain:
End-result variables
Lower sales volume
Higher sales costs
Lower quality of business sold
Lower earnings by salesmen
Higher sales volume
Lower sales costs
Higher quality of business sold
Higher earnings by salesmen

Likert goes on to discuss other important variables, which undoubtedly apply quite directly to interdisciplinary programs.

> Human assets, as used in this volume, refer both to the value of the productive capacity of a firm's human organization and to the value of its customer goodwill.
>
> The productive capability of its human organization can be illustrated by thinking of two firms in the same business. Both are of the same size and have identical equipment and technology. One, however, produces more and earns more than the other, because its personnel is superior to the other's with regard to such variables as the following:
>
> 1. Level of intelligence and aptitudes
> 2. Level of training
> 3. Level of performance goals and motivation to achieve organizational success
> 4. Quality of leadership
> 5. Capacity to use differences for purposes of innovation and improvement, rather than allowing differences to develop into bitter, irreconcilable, interpersonal conflict
> 6. Quality of communication upward, downward, and laterally
> 7. Quality of decision making
> 8. Capacity to achieve cooperative teamwork versus competitive striving for personal success at the expense of the organization
> 9. Quality of the control processes of the organization and levels of felt responsibility which exist
> 10. Capacity to achieve effective coordination
> 11. Capacity to use experience and measurements to guide decisions, improve operations, and introduce innovations
>
> . . . . . .
>
> Human asset accounting refers to activity devoted to attaching dollar estimates to the value of a firm's human organization and its customer goodwill. If able, well-trained personnel leave the firm, the human organization is worth less; if they join it, the firm's human assets are increased. If bickering, distrust, and irreconcilable conflict become greater, the human enterprise is worth less; if the capacity to use differences constructively and engage in cooperative teamwork improves, the human organization is a more valuable asset.

With regard to individual personalities, preliminary data indicate that certain qualities characterize both pre-doctoral and post-doctoral fellows, in the discipline of Early Childhood Special Education, who seem to profit most from an experience in an interdisciplinary program. These qualities are ascertained by their self-

report (on questionnaires and interviews), by relatively more objective test performance (on Rokeach's Dogmatism Scale, California Personality Inventory, and Harvey's This I Believe Attitude Scale), and by supervisor ratings. The person whose personality structure is characteristically open, curious, creative, having high tolerance of ambiguity and an overall nondogmatic approach, fares far better both in terms of performance as judged by self and others as well as overall comfort in the setting. Data to support these statements, plus a much more detailed discussion of their implications for student-fellow(ette) selection are available elsewhere (Reed & Meier, 1973).

A series of obstructions preventing full interdisciplinary functioning stems from some traditional professional pecking orders which have for years relegated one or another discipline to the top or the bottom of the hierarchy, which is usually correspondent to the number of years of training, degrees (BS, MS = more of same; Ph.D.'s = piled higher and deeper; M.D. = much deeper), average salary levels (typically a function of supply and demand) and perceived criticalness in relation to human survival (typically the reverse of Maslow's hierarchy of self-actualization; i.e., physical well-being has highest priority and value).

There are other related obstacles to full and happy interdisciplinary functioning. Although the following citation is primarily addressed to the health fields, the observations certainly apply to even more complex programs, like UAF Child Development Centers.

> The Committee...has found, however, some objective (but mostly subjective) evidence of differences between the various health professions that could impede adequate communication between members of the various health professions, contribute to misunderstanding and distrust or maintain ignorance of each others' accomplishments and potentialities.
>
> Some of these differences appear to be social or psychologic in origin; others seemed to relate to problems of economics and of education. The Committee found that differences exist between the goals, training and technology of the various professions; in fact, these exist not only between professions but within professions as well. In medicine the divergent orientations of surgery and psychiatry may serve as an example; within nursing this difference in orientation is illustrated in the conflict between nursing education and nursing service; in rehabilitation one may find a difference in orientation between physiotherapists and occupational

therapists. Related to these differences is the status ascribed to the various health professionals. The physician enjoys a most esteemed social position in society; at the same time status of some of the other professions in the health field is considerably below that of the physician, and even below that of certain occupations requiring comparable education and responsibility. The disparity between status is reflected in the differences in income and the varying degree of enthusiasm and motivation manifested in the work of some of the professionals.

Conflict between professions also appears to be caused by the lack of definition of areas of responsibility related to the rapid pace of technologic developments. Examples here may include the territorial conflicts of the clinical psychologist and the psychiatrist; the nurse clinical specialist and the physician; the licensed practical nurse and the diploma nurse; the social worker and the public health nurse.

In addition, certain social and psychological factors outside the professions place obstacles in the way of effective professional cooperation. The public tends to hold certain attitudes and beliefs regarding medicine, nursing, social work and the other health professions. The fact that many professionals are women promotes the notion that some of these professions should be characterized mainly by the capacity for tenderness and sympathy on the part of their practitioners. The work of the physician tends to be regarded by many, including those in some of the health professions, as a glamorous activity in which the physician is leading a battle against disease. The battle is often regarded as an almost completely scientific endeavour, and not as an art in the application of science.

In this context the Committee found that many professions have difficulty in projecting desirable up-to-date images to the public. The social worker's past image as an almoner has not yet been erased; the image of the pharmacist as a drug store proprietor appears to be fixed; the image of the nurse as a competent modern professional person has still not been fully accepted; and the rehabilitation therapist is still often referred to as the kindly "rheumatic nurse." Because of these difficulties the position of the various health professionals within the group that may cooperate is uncertain, and even the image of the physician as a consultant or a leader of the team is debated more on emotional than on factual grounds.

The idea of health itself is difficult to define. Although much is being written about the need for a comprehensive type of health care, the belief that consideration of the social aspect of health problems has no place in the

repertory of the physician is still quite prevalent today. These beliefs and attitudes on the part of some members of the health professions have important influence on those who wish to practice more comprehensive medicine (Szasz, 1969, pp. 451-53).

Some [redacted] a discipline low on the totem pole in a democratically-man[redacted] program can raise its position by dint of sheer numbers, [redacted] therefore votes. When this is not possible, the relatively low discipline may elect to splinter off and form its own entity and proliferate other lesser and therefore subservient disciplines in order to get on top of a smaller mountain or, as the cliche goes, to be bigger fish in smaller ponds. This can occur within an interdisciplinary program and create barriers even higher and thicker between disciplines in the program, much as in Festinger's (1957) theory of cognitive dissonance, wherein the person or discipline characterized by a closed cognitive field tends to encapsulate and isolate itself from other functional entities in its life space, i.e., the Central Interdisciplinary Program. This is supportive of Lewin's theory of personality (1935) in which areas of unusual tension in a relatively closed personality system can become essentially out of contact with the other portions of the differentiated life space in order to maintain some tolerable level of equilibrium. The progressive disenchantment between two rather similarly focused disciplines can become viciously circular, feeding on itself in a downward spiral of interpersonal and interprofessional hostile relations.

> Interdisciplinary programs need continual reinforcement if they are to remain viable. In their formative or innovative period the cooperation of experts on a joint program is usually heralded as promising and meritorious. Unfortunately, the cooperative elan subsides as the problems of working together are rediscovered. The weariness of long meetings, small bickerings over content, the frustrations in having one's course reduced or emasculated, and disillusionment over the tactics of some academicians all serve to make the independently taught course more appealing....
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> ...The leader's role is to guide the team toward a unified effort in the face of the pressures its various specialists meet from their parent disciplines. In some cases, the interdisciplinary specialist is viewed by his colleagues as an inferior scholar. For this reason it is important that the team members are not so status involved that they are unwilling to face this pressure. Successful interdisciplinary or crossdisciplinary programs are usually made up of

> groups of people who are willing to work together and are not so status involved that they are unwilling to face new learning. They are also characterized by the evenness of quality that is reflected in the staff and by their ability to agree at the level of overall theory...(Heiss, no date, pp. 23 & 25).

A fundamental theoretical agreement is very difficult and perhaps undesirable to achieve in a truly interdisciplinary organization. We have spent considerable time and effort with mixed success and discouragement in trying to develop and offer for trainees a core curriculum, which at least exposes them to the kaleidoscopic views of human growth and development as seen through the eyes of various disciplines. Szasz (1969) has some encouraging and enlightening observations about this process.

> The first area of innovation concerned the students' learning experiences. The Committee agreed with previous suggestions that all students of the health professions may need to share certain basic knowledge. This body of knowledge might include the evidence for the description of the relation between man's cultural background and his notions of health or illness; the methods of communication between patients and health professionals, and between the health professionals; the social institutions assisting an individual citizen, and the voluntary and official institutions serving him; the economy of the country that subsidizes these services and the political forces that often influence them. It should include certain basic biologic sciences in depth proportional to the student's needs and interests, and it should include some clinical knowledge, again in varying depth according to the expected future role of the various professions.
>
> Recognizing that to achieve these objectives the methods used in providing learning experiences may be as important as the content, the Committee decided to experiment with lectures offered to mixed classes of students of various professions; learning experiences offered in the framework of seminars, rounds, conferences, family visiting projects, field work, summer projects and self-instruction; and within these, extensive use of special audiovisual effects and techniques such as role playing, videotape replays and various other methods of communication.
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> To acquaint student leaders with the idea of interprofessional education, a retreat was organized for student representatives during the summer months. After two days of very intensive, and often excited, discussions between students

> and participating faculty, the students expressed the hope that the present structure of educational programs might be modified to accommodate interprofessional educational experiences, and that within these the utilization of the principles of behavioral sciences might be increased, particularly those related to group dynamics. One outcome of this conference was the formation of a Council of Interprofessional Health Education, an ad hoc organization of about 30 students. The Committee has decided to observe the activities of this group without interfering. Within a few months of its formation this enthusiastic student group tripled its size. At first it was involved mostly in social activities, such as interprofessional student dances and a skating party. The group has now reoriented itself to the consideration of matters related to the interprofessional curriculum. Students of the lower years of medical school, all years of nursing, rehabilitation medicine, social work, home economics, pharmacy, dentistry and other faculties such as education, theology and law, are participating on the Council (pp. 459 & 468).

Evaluation

And this brings us to the real rub, namely, evaluation of the impact of interdisciplinary educational programs not only on the students but perhaps more importantly upon the focal children with whom these educated professionals subsequently interact. Harking back to the rationale for interdisciplinary training presented at the outset of this essay, do persons who have been educated in interdisciplinary settings truly have a more beneficial impact upon the children they serve? Are they able to better appreciate their own strengths and limitations and therefore make more appropriate referrals to other professionals when they reach the limit of their own professional expertise? Unfortunately, these data are not readily obtainable nor very extensive at this writing, partly because the synthesizing efforts represented by interdisciplinary education programs are relatively new and secondly because follow-up data on students has been rather scanty and very difficult to marshall into a rigorous and compelling form. Nevertheless, Szasz does present some conclusions which largely corroborate the experience of the JFK Child Development Center's interdisciplinary educational program.

> Each program offered under the auspices of the Committee on Interprofessional Education has been evaluated according to objective or subjective criteria. Evaluation of the projects has proved to be exceedingly difficult, even with

regard to short-term objectives, and has not been attempted yet in terms of the long-range objectives of the interprofessional education plans. In general, however, the experiences gathered over the two years suggest the following tentative conclusions:

1. The students are receptive to learning experiences that indicate their relative position to other professionals in the context of future professional roles.

2. The students of one profession react positively to students of other professions in their classes if they receive an explanation of the need to have common learning experiences; conversely, they tend to resent or, at best, to ignore the presence of students in the class or the clinical group if the reason for this is not made clear. It appears that students feel that their learning experiences are being "diluted."

3. Students of mixed classes, without especially arranged opportunities for interaction do not, as a rule, discuss their educational experiences and, in fact, they do not even talk to each other.

4. Students in mixed classes need opportunities to clarify for themselves the applicability of the common subject matter to their own professional orientation. Lectures to mixed classes followed by separate or mixed seminars to discuss the varying perspectives of professional groups, appear to be useful for this purpose.

5. Each school has in its curriculum certain subject matters and teaching resources that may be shared with others to the profit of all; because resources are often not shared the standard of the educational program varies greatly between schools.

6. Films and videotaped programs often may be used to deliver the same information to all the groups without interference with timetable and without added demands on scarce staff resources, by permitting the student to view these at his convenience.

7. Utilization of the problem-solving method in learning experiences appears to be the most promising means for development of collaborative relations.

8. Educational programs oriented to problem solving, whether they are in clinical or classroom situations or in community projects, need to be supported by tutorials so that the various aspects of collaboration may be illuminated.

9. Electives and out-of-school programs may have considerable value in certain aspects of interprofessional education, provided that the students have freedom to exercise their creativity.

10. Emotion-provoking audiovisual techniques have a place as an approach to a mixed class of students when an attempt is being made to establish common attitudes to certain problem areas.

11. Mixed group discussions necessitate trained group leader support.

12. Timetable problems pose great difficulties in the organization of interprofessional courses.

13. Physical separation of the various schools causes a great difficulty in organizing shared experiences.

14. Several schools and faculties have such a heavy workload and full timetable that most students are unable to participate or visit education programs of other schools.

15. Introduction of a few hours into the existing timetables of various schools for the presentation of new course material (health team, sexual behaviour, pathology, emerging roles, and so forth) has been possible because of the interest of the teachers and the students, rather than because of decisions made by the curriculum committees of the schools.

16. Students of the last year of medicine in 1967-1968 and 1968-1969, appeared to be less interested in interprofessional projects than students of similar years in other faculties. The Committee, reasoned that the current fourth-year medical students are more secure in their future role and feel less need for cooperation than the final-year students of other schools, who are aware that collaboration is needed if they are to practice that which they have learned. Students of the current first and second years in medicine appear to be interested...(Szasz, 1969, pp. 465-467).

Furthermore, there is a good deal of intuitive belief on the part of staff and students who have experienced both unidisciplinary and interdisciplinary training that the latter certainly enables them to function more knowledgeably among professionals from many disciplines in the real world setting. There seems to be ample evidence that no single professional can be all things to all children but it is still an heuristic hypothesis that the child who is evaluated or remediated by an interdisciplinary team improves faster and/or further than a matched counterpart receiving only the benefit that one professional or a single discipline might typically have to offer. It does seem reasonable that given the complexities of a normally-developing child, let alone a developmentally-disabled child, no single professional or discipline has a sufficient diversity of resources and breadth of perspective to adequately address all of the important variables.

On the other hand, multi- or interdisciplinary investigations of a given child or such education of professionals and paraprofessionals may unduly complicate a relatively simple matter, simply by raising a number of questions, lest some stone be left unturned, and prompt a sort of seductive prophesy fulfillment by creating suspicions which traditionally have gone unsuspected. When the educational component is set aside, it may be extremely difficult and embarrassing to try to justify the vast additional expenditures in manpower, time, and effort and the corresponding money required to raise a number of unproductive and possibly counterproductive questions under the pretense of offering comprehensive and thorough service to a given child.

When a cost-benefit analysis is computed solely on the service aspects of an educational program (which does some additional clinical research into its training quality) the nearly astronomical cost per child visit could easily lead to the conclusion that such efforts are of questionable value and perhaps even detrimental to the child involved. An analysis of this would require determination as best as possible of the numbers of false-positives and false-negatives that are avoided by persons educated in interdisciplinary programs once they go out on their own into private practice or become integral parts of other interdisciplinary teams, whose prime function is to render comprehensive service without educational considerations. The null hypothesis will be stated: professionals and paraprofessionals educated in interdisciplinary settings do no better a job in the real world, whether or not they end up in large interdisciplinary settings or small unidisciplinary practices. This is an heuristic issue which the network of UAF Child Development Centers is pre-eminently well-suited and, this writer would submit, obligated to research. In speaking of the universal city of Ecumenopolis of man for the year 2000, Doxiadis concludes his remarks with an exciting challenge to which child developmentalists also must address themselves or suffer the consequences of default--could they be sued collectively for malpractice or child abuse and neglect in a class action in behalf of the younger generations for standing idly by as the environment becomes increasingly pernicious to human development?

> If we can define our goals; if we can define the relationships of man and his city; if we can learn from the huge laboratory operating on the surface of the earth; if we can undertake very careful experimentation, because we are dealing with people and not with machines; then we can be prepared to build the great cities of man. These great cities will no longer crush man within their bowels, but will let him develop to his utmost extent. If we can achieve this,

> we may help man to develop further towards his next evolutionary stage, guaranteeing him the best possible for his benefit.
>
> However, there is one absolute prerequisite. We must have the courage to develop our hypothesis in the best possible way and then to test it. We must do this, in order to answer, in the best possible way, all those questions presented in this system of ideas and evaluate the answers already given, in order to ameliorate them and lead to the most justifiable conclusions (1968, pp. 31-32).

If Fuller (1969) is even half right in his assertions about the influence of environment upon humanity, without getting into the perennial nature/nurture controversy, it seems imperative that time is of the essence if desirable changes are to be effected by the year 2000.

> Focus on new life. Recognizing that humanity consists of all ages, it is obvious that before any of the objectives of one have become fulfilled many human individuals will have died. As a consequence, it becomes necessary to set up time and beneficiary priorities within the total scheme.
>
> The behavioral sciences have disclosed the direct effects of the environment on new life. These are so great as to make it clear that the environment (including all the dynamic events and humans operative within the "scenery") is more than 99% responsible for the lives becoming capable and happy or frustrated and confounded. And the most profound effects on human life have been completed within the first 17 years. Ninety-eight per cent of the environment's positive or negative effects have been wrought upon the new life by age 13, eighty per cent by age 8, fifty per cent by age 4. It is obvious that effective work in advantaging life through favorable environment transformation can be realized within the first 13 years of human life and particularly in the first 4 years of life.
>
> In order for the individual to be objectively effective as a design scientist in altering the environment on behalf of his fellow man, it is necessary for him to organize his efforts so that they may become operative a sufficient number of years ahead of his original initiating, to be able to transcend any frustration of his efforts by the momentum of already invested interests. This period has been discovered to be one generation, or 25 years. My work was initiated in 1927 and was designed to become effective in 1952. This proved to be a realistic forecast (pp. 90-91).

Aldrich and Donaldson (1972) have elaborated extensively on the interdisciplinary child development aspects of the child in the city, particularly as traditional and vertical ghettos adversely influence his perception of reality and consequent growth and development; however, the scope of this essay does not permit going into these phenomena here.

Conclusion

This essay raises many more questions about the qualitative and quantitative aspects of interdisciplinary educational programs than it offers clearcut categorical answers. But that is to be expected, since it is characteristic of a person educated in an interdisciplinary program to ask such provocative and complex questions. There are some heuristic hypotheses advanced about the importance of matching evolving professional and paraprofessional personalities and programs for optimum interdisciplinary education. Factors which facilitate or obstruct the growth and development of interdisciplinary educational programs are discussed. Questions about cost-benefit factors in education and service are surfaced. Fundamental clinical research is indicated in these areas, research which may in turn raise more questions than it finds answers but at least it will take a comprehensive and careful look at interdisciplinary education at a time when it is enjoying a certain mystical reputation that must be substantiated or dispelled with hard data.

REFERENCES

Aldrich, R.A. and Donaldson, O.F. The child in the urban environment: A review of literature and research. In Wisniewski, R. (Ed.), Teaching About Life in the City, 42nd Yearbook, 1972.

Allport, G. Theory of an open personality. In Buckley, W. (Ed.), Modern Systems Research for the Behavior Scientist. Chicago: Aldine, 1968, 3-10.

Beck, H.L. The advantages of a multi-purpose clinic for the mentally retarded. Amer. J. of Mental Deficiency, Vol. 66, No. 5, March 1962, 789-794.

Boulding, K. General Systems Theory - The Skeleton of Science. In Buckley, W. (Ed.), Modern Systems Research for the Behavioral Scientist. Chicago: Aldine, 1968, 3-10.

Buckley, W. (Ed.) Modern Systems Research for the Behavioral Scientist. Chicago: Aldine, 1968.

Cruickshank, W.M. An Interdisciplinary Model for Manpower Development for Mental Retardation. Ann Arbor, Mich.: Institute for the Study of Mental Retardation, 1972.

de Chardin, P.T. The Future of Man. New York: Harper & Row, 1964.

Doxiadis, C.A. The City and the Development of the Child, A Basic Concept for Our Cities. In Doxiadis, et al., Ekistics, Athens, Greece, 1969, 10-32.

Erikson, E.H. Childhood and Society. New York: W.W. Norton, 1950.

Festinger, L.A. A Theory of Cognitive Dissonance. New York: Harper & Row, 1957.

Fuller, B. Letter to Doxiadis Main Currents in Modern Thought. 25:4, 1969, 87-97.

Harvey, O.J. Some situational and cognitive determinants of dissonance resolution. J. of Pers. Soc. Psychol., 1965, 1:349-355.

Heiss, A.M. The multidisciplinary or the interdisciplinary approach to professional education. No date.

Leichman, D.S. The Interdisciplinary Role of the Educator. Los Angeles: L.A. City School Districts, Spec. Educ. Branch, May 1967.

Lewin, K. A Dynamic Theory of Personality. New York: McGraw-Hill, 1935.

Likert, R. New Patterns in Sales Management. In M.R. Wershaw (Ed.) Changing Perspectives in Marketing Management. Ann Arbor, Mich.: Univ. of Mich., 1962.

Likert, R. The Human Organization - Its Management and Value. New York: McGraw-Hill, 1967.

Maslow, A. Motivation and Personality. New York: Harper, 1954.

Morrison, P.A. Interdisciplinary Obfuscation. Saturday Review, 1973, p. 15.

Szasz, G. Interprofessional education in the health sciences. Milbank Quarterly, Vol. 47, 1969, 449-475.

Van Antwerp, M. An interdisciplinary approach to functional mental retardation. Mental Retardation, February 1970, 24-26.